



## Incentivization of the Green Rated Projects by Government for Promoting Sustainable Development: Case Study of Indian States and Union Territories

Anshul Jain<sup>1\*</sup> and Ananda Babu K.<sup>2</sup>

<sup>1</sup>Research Scholar, Department of Civil Engineering, SVVV, Indore (Madhya Pradesh), India.

<sup>2</sup>Associate Professor & HOD, Department of Civil Engineering, SVVV, Indore (Madhya Pradesh), India.

(Corresponding author: Anshul Jain\*)

(Received 18 June 2024, Revised 16 July 2024, Accepted 18 August 2024)

(Published by Research Trend, Website: www.researchtrend.net)

**ABSTRACT:** The developing countries are continuously witnessing the rapid urbanization. The infrastructural development is directly proportional to development of any nation. In this scenario it is equally important for any country to adopt sustainable or green building technologies. The incentives by the concerned government bodies are a great source of inspiration for any developer or owner of the project. In the current research work an attempt has been made to highlight the benefits of constructing a green rated project as per the guidelines of Green Rated Integrated Habitat Assessment (GRIHA), Indian Green Building Council (IGBC), Leadership in Energy and Environmental Design (LEED) etc. which are the most popular rating system of the nation. These rating system works streamlined as per the Indian government policies by adopting several measures in the design, operation, and construction of the projects. 17 states and Union territories of India are willingly providing incentives if the project has been certified as green by GRIHA, IGBC, LEED etc. About 25% of the proposals for smart city have inculcated green rating system. The current incentivizing schemes of the government will attract the attention of the remaining states and Union territories in India to promote incentivization of green rated projects.

**Keywords:** Urbanization, Sustainable construction, Incentivization, Green rated projects, Low carbon emission.

### INTRODUCTION

About 50% of the population residing in the world is a part of city. Due to the economical and developmental activities, negative impact is created over the environment (Balaban and de Oliveira 2017). As a result, the Carbon dioxide emissions have increased a level of 35 billion tones already in 2012. Due to which the gap between the noble cause of reducing CO<sub>2</sub> emission and the sources of releasing CO<sub>2</sub> in atmosphere is arising rapidly (Sun *et al.*, 2019). In the manmade fraternity, buildings are the major source of CO<sub>2</sub> emission in any city, accounting to 40% of the energy needs (Saadatian *et al.*, 2012).

The measures of reducing the carbon emission from buildings can aid in improving the life of the habitants and simultaneously lead to the path of sustainable development. One such solution of reducing the environmental burden is the construction of green rated projects and green buildings (Alwisy *et al.*, 2019).

The aim of the current research paper is the promotion of green buildings in the developing country like India. Various state government and union territories in India have started providing incentives to promote the green building initiatives. Similarly, an attempt is being made that the remaining states and union territories also start

promoting this concept. The incentives motivate the builders & developers to go for green rated projects rather than the conventional one (Li *et al.*, 2014). Green building can be also termed as ecological building, sustainable building (Ghaffarian Hoseini *et al.*, 2013). The green building utilizes the renewable energies, technologies to design passive building, along with waste management techniques to minimize land filling of waste (Gupta *et al.*, 2022).

**Table 1: Evaluation system of GRIHA.**

Sr. No.	Points scored	Rating
1.	50-60	One star
2.	61-70	Two stars
3.	71-80	Three stars
4.	81-90	Four stars
5.	91-100	Five stars

The construction of green buildings is one of the most important way by which energy and water can be saved. The reduction in solid waste and waste water generation is another milestone which has been achieved by green rated projects. Studies have proved that as per the star ratings of the green rated residential and commercial projects, all the concerned data varies accordingly.

**Table 2: Energy savings by green rated projects.**

Sr. No.	Type of certification	Energy savings (%)	
		Commercial Projects	Residential Projects
1.	GRIHA 1 Star	36	43
2.	GRIHA 3 Star	54	57
3.	GRIHA 5 Star	61	64
4.	IGBC Silver	36	39
5.	IGBC Gold	53	54
6.	IGBC Platinum	56	59

**Table 3: Water savings by green rated projects.**

Sr. No.	Type of certification	Water savings (%)	
		Commercial Projects	Residential Projects
1.	GRIHA 1 Star	69-100	47-72
2.	GRIHA 3 Star	69-100	57-83
3.	GRIHA 5 Star	75-100	68-90
4.	IGBC Silver	43-83	76-97
5.	IGBC Gold	76-100	77-97
6.	IGBC Platinum	76-100	77-94

**Table 4: Reduction in solid waste by green rated projects.**

Sr. No.	Type of certification	Solid waste reduction (%)	
		Commercial Projects	Residential Projects
1.	GRIHA 1 Star	51	51
2.	GRIHA 3 Star	55	55
3.	GRIHA 5 Star	60	60
4.	IGBC Silver	46	51
5.	IGBC Gold	46	55
6.	IGBC Platinum	51	60

**Table 5: Reduction in waste water by green rated projects**

Sr. No.	Type of certification	Waste water reduction (%)	
		Commercial Projects	Residential Projects
1.	GRIHA 1 Star	67-76	58-81
2.	GRIHA 3 Star	72-86	66-88
3.	GRIHA 5 Star	86-92	85-88
4.	IGBC Silver	52-66	98-100
5.	IGBC Gold	83-91	95-96
6.	IGBC Platinum	83-91	95-97

**Table 6: Cost Increments of green rated projects.**

Sr. No.	Type of certification	Cost Increments (%)	
		Commercial Projects	Residential Projects
1.	GRIHA 1 Star	2.5-6.6	2.6-3.8
2.	GRIHA 3 Star	6.5-11.9	4.8-5.2
3.	GRIHA 5 Star	9.7-14.8	6.5-7.7
4.	IGBC Silver	3.4-8.1	2.3-5.8
5.	IGBC Gold	5.7-11.9	6.6-9.9
6.	IGBC Platinum	9.1-15.1	6.7-7.7

It has been estimated that if 10 million m<sup>2</sup> of a project certified 5 stars by GRIHA have been constructed than it can provide sufficient electricity to power approximately 100000 urban homes. The water savings by the same will be sufficient to supply the needs of approximately 22000 urban homes. It has been predicted that the demand for electricity supply will be 5 times and 3 times more than the current time for residential and commercial projects respectively. Currently only 25 out of 100 smart cities have taken rating system into consideration for attaining the mission of smart city. The major finding is that the current framework of local government bodies does not allow the inculcation of green rating systems (Ministry

of Statistics, 2019).

## LITERATURE REVIEW

**The Concept of Green Building.** Due to the energy crisis in 1960's various research has been going on to improve energy efficiencies and simultaneously declining the environmental pollution. Similar problem was being faced by the construction sector, hence to deal with this situation the concept of green building came into the existence gradually. To explain this concept to the world, various rating systems have been developed across the world. Here the researchers have tried to define the green buildings based on the parameters adopted by different countries.

The situation of development is based on two factors, external factor which includes the development of the concerned policies, schemes of certification and economic advantages. Internal factors comprise of technology applications and the way users will interact with these green technologies. Currently more than 48 green building standards have been devised across the world which also includes 18 appraisal systems specified by the experts. To effectively use the green building technologies, it is mandatory to improve the policies and incentive systems by the government (TERI, 2018).

Simultaneously the quality of professional judgements, technical ability of the workers and employees and relevant consultants' involvement shall be improvised. All these will collectively help in the National development, formulation of accurate policies and will promote the construction companies to eradicate the obstacles in the path and work for the intensive research for the future.

1. The Global issue of managing the waste arising due to rapid urbanization can be handled by constructing green buildings.

2. The green buildings can aid in improving the indoor air quality, better Heat, Ventilation and Air Conditioning (HVAC) and the recycling of materials will increase.

3. Green buildings are reducing negative environmental effect by neglecting the use of fossil fuels in development. They also improve the quality of life of the residents by environment friendly initiatives.

**Need for Green Building.** In the long term these green buildings will be affordable to us because the overall savings in terms of energy, water consumption and reduction in the waste (solid and liquid) will promote the sustainable development as well. This long-term operating cost benefits will also improve the health standards of the occupants. Thus, it can be said that looking only to the up-front cost of the project is not correct, rather the vision shall be the long-term benefits and improvised health conditions of the residents.

The government shall thus take a lead in this case and promote the construction of green buildings so that the developers as well as stake holders purchasing the projects can be attracted to go for green rated ones rather than the traditional ones. An attempt has thus been made to present the overall history of incentivization before the other state governments and Union territories of India [GRIHA, 2019].

## CONCLUSIONS AND DISCUSSION

As per the directives by the authorities of various Indian states and Union territories, incentivization of the green rated projects is being done to promote the sustainable construction. The details of these incentives have been illustrated here.

### 1. Andhra Pradesh

Municipal Administration and Urban Development Department, government of Andhra Pradesh is providing incentives to the projects who are green rated by GRIHA/IGBC/ LEED and following the Andhra Pradesh Energy Conservation Building Code

(APEECBC) since 2017. The details of incentives include

(a) Relaxation of 20% on the permit fees

(b) The development charges can be submitted in 4 equivalent installments before the project gets completed as specified in the permit order of the building.

(c) Also, for a single time 20% reduced duty on transferring property can be achieved if it is sold under 3 years duration.

The Industries and Commerce department of Andhra Pradesh is keen interested to follow the green measures for sustainable development of industries. Hence the government is providing a subsidy of 25% of the overall fixed capital (up to 50 crores) of green rated project by GRIHA, but it does involve the land cost, land development and consultancy charges. This incentivization applies to large scale industries along with MSME's.

### 2. Delhi

The Delhi Development Authority supports the green construction initiatives by offering 1-5% additional Floor Area Ratio (FAR) and ground coverage for projects constructed over 3000 m<sup>2</sup> area which are green rated by GRIHA since the year 2013 without any extra cost. Penalty is also levied on the project owner in case of noncompliance condition after having obtained the occupancy certificate.

### 3. Chandigarh

The administration of Chandigarh has made a mandatory compliance since 2015 to follow the guidelines of CPWD and ensuring that every public building is at least rated 3 star as per the norms of GRIHA

### 4. Goa

The Town and Country Planning (TCP) Board of Goa have enforced the green building concepts since January 2019. They are working streamlined as per Indian Green Building Council (IGBC) and The Energy and Resources Institute (TERI) to follow their guidelines. It is mandatory for all the public buildings, hotels and commercial complexes having 2000 m<sup>2</sup> or more built-up area to construct green rated projects.

### 5. Gujarat

(a) As per the Urban housing department under the Gujarat comprehensive Development control regulations 2017, the incentives provided to the green certified projects is in the form of 5% discount in the FSI charges but the project must have been applied for GRIHA rating before the project has actually commenced.

(b) As per the Industry and Mines department, Gujarat since 2015 support is being provided to all the industrial infrastructure which are having 2000 m<sup>2</sup> or even more built-up area in the form of 2.5 lakhs rupees or 50% of the consultancy charges (lesser one) This will encourage green practices in the state.

(c) The Ahmedabad Urban Development Authority, Gujarat has listed out all the guidelines and procedures since 2015 related to the regulation and planning of the buildings. 5% discount in the FSI charges will be waved off but the project must have been applied for GRIHA rating before the project has commenced.

## 6. Haryana

The Renewable Energy Development Agency of Haryana in 2019 has made it compulsory to develop green infrastructures specially in Government and Public Sector Undertakings. The green rating can be specifically in accordance with GRIHA or other national rating systems.

Also, the Town and Country Planning department in the year 2017 has declared incentivization for buildings from 1 star to 5 star by agencies like GRIHA, LEED and IGBC. The additional FAR will be provided in the range of 3%, 6%, 9%, 12% and 15% respectively from 1 star to 5-star rating by GRIHA. If the building is Silver, Gold and Platinum rated by IGBC or LEED, then 9%, 12% and 15% additional FAR is going to be provided.

## 7. Himachal Pradesh

The Town and Country planning department of Himachal Pradesh is keen interested to provide 10% extra FAR to the projects which have been either certified either 4 or 5-star by GRIHA or provided with Gold and Platinum rating by IGBC.

## 8. Jharkhand

The Urban development and housing department of Jharkhand has declared since 2017 to provide additional FAR up to 7% to various projects which are certified green rated by GRIHA or IGBC depending on the level of rating.

## 9. Kerela

The Public Works Department of Kerela has taken a decision in 2011 that it is compulsory for all the types of private and public projects (excluding only the residential projects whose plinth area is below 500 m<sup>2</sup>) to apply for green certification. It is recommended that the smaller residential infrastructures may get green rated by agencies like IGBC green homes or SVA GRIHA etc.

## 10. Maharashtra

(a) The Pune Metropolitan Region Development Authority (PMRDA) along with Pune Municipal Corporation (PMC) under the government of Maharashtra since the year 2017 is keen interested in providing 3%, 5% and 7% FAR in addition to the permitted if IGBC has certified it as Silver, Gold or Platinum rated respectively. Same incentives are provided if GRIHA has certified it as 3-star, 4-star or 5-star rated project.

(b) Since 2016 the PWD Maharashtra has asked to follow the guidelines of National agencies providing green certification for all the existing (which must undergo major repair work) or newly constructed government infrastructures.

(c) According to the Pune Municipal Corporation (PMC) since 2015, the developers may receive discount on the charges which are payable to them in the range of 5%, 10% or 15% if GRIHA certifies it 3-star, 4-star and 5-star or IGBC certifies the same project as Silver, Gold or Platinum rated.

## 11. Odisha

The Bhuvneshwar Development Authority (BDA) has been promoting the construction of green buildings and projects since 2018 as a part of National sustainable habitat mission on uplifting the

energy efficiency of the buildings. The incentives will be fetched on being certified green by a project by different rating agencies like IGBC, GRIHA, LEED, Energy Conservation Building Code (ECBC) etc. as per the government policies based on durations.

## 12. Punjab

(a) The department of local government, Punjab since 2016 is encouraging the construction of green buildings by providing incentives in the form of extra 5% FAR without any charges if the project has been certified Gold or above by IGBC or 4-Star and above by GRIHA.

(b) The PWD Punjab is willingly planning and designing for green buildings by GRIHA or IGBC since 2016 and also including the additional cost in the detailed estimates before getting approvals for project.

(c) The Department of Housing and Urban Development, Punjab government has stated in 2013 that they will be incentivizing the developers in the form of additional 5% FAR if the building has been certified by GRIHA, but in case the promoter is not in a condition to provide maintenance certificate after 5 years tenure then 200% of Extra FAR will be levied as penalty.

## 13. Rajasthan

(a) The Urban Development Department of Rajasthan govt. has stated in 2019 that if the project receives Silver rating then 7.5% additional Building Area Ratio (BAR) will be provided, if it is gold rated then 10% BAR and if it is Platinum rated then 15% extra BAR will be provided as incentive. If the developer has built the extra BAR and green rating has not been received than development tax will be levied as penalty which can be received back by the developer as soon as they submit the rating documents.

(b) The department of Urban development, Rajasthan govt. has ensured since 2015 that the developers of projects are liable to receive excessive 5% FAR if the same project has been certified as green by the national rating agencies like IGBC, LEEDS etc.

(c) The Jaipur Development Authority has declared since 2014 that buildings having area more than 5000 m<sup>2</sup> can receive extra 5% FAR if they have been awarded with 4 or 5-star rating by GRIHA.

## 14. Sikkim

The building and housing department of Sikkim govt. has mandatorily started promoting sustainable development of infrastructures since 2015. It applies to all types of govt. and semi govt. buildings may it be industrial, residential, nonresidential, healthcare etc. to work for at least 3-star rating by GRIHA.

## 15. Uttar Pradesh

(a) The Housing and Urban planning department of U.P. is providing extra 5% FAR for projects going to receive either 4 or 5-star rating by GRIHA.

(b) The housing and urban planning department is providing 5% extra FAR without any charges if the project is being certified as Gold or Platinum by LEED or IGBC. It applies to all buildings having area more than 5000 m<sup>2</sup>.

(c) The Greater Noida Industrial Development Authority since 2016 is providing incentive in the form

of extra 5% FAR if the project has been awarded with Gold or Platinum rating by IGBC or LEED.

(d) The NOIDA and Greater Noida local govt. bodies are providing additional 5% FAR to the green rated projects by GRIHA (4 or 5-star) and LEED (gold and Platinum), condition being the minimum plot size is 5000 m<sup>2</sup>.

### 16. Uttarakhand

The Mussoorie Dehradun Development Authority has initiated the policy of incentivization in the year 2017 that if a private project is able to achieve 3, 4 or 5-star rating by GRIHA or Silver, Gold and Platinum rating by IGBC/LEED etc. then they can receive additional FAR free of any charges in the range varying from 10%, 20% and 30% respectively. The highest incentive is being provided here in terms of FAR. Also it has been mandatorily asked from all the PSU, State govt. and semi govt. bodies to follow the norms

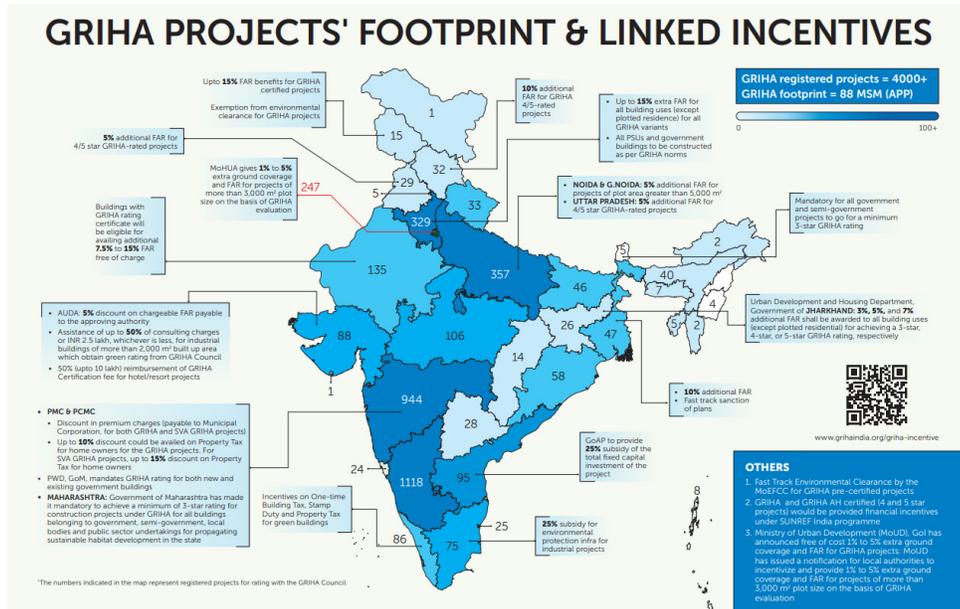
of 4-star rating by GRIHA or Gold rating by IGBC. This will be ensured when the Architect of the project will be submitting documentary proofs of implementing the same.

### 17. West Bengal

The department of Urban Development and Municipal Affairs in 2018 declared to provide 10% FAR in excess to those green buildings which have been tagged as gold or platinum rated by LEED. Simultaneously the New Kolkata Development Authority in 2016 stated that 10% FAR will be provided to projects which are provisionally certified or rated gold/Platinum by IGBC and 4-star or 5-star by GRIHA. The same incentives were already declared by the department of Municipal Affairs in the year 2015.[Ministry of Urban Development, 2015] The details collected above can be summarized in the form of table and figure as shown below.

**Table 7: Nature of Incentives provided by Indian States & Union Territories (Soni Alankrita and Priyanka Kochhar 2020).**

Sr. No.	Name of State or Union Territory	Year of applicability	Nature of incentive
1.	Andhra Pradesh	2015	Financial (Permit fees relaxation)
2.	Chandigarh	2015	Mandatory to be done (Govt.)
3.	Delhi	2013	Additional FAR & Ground coverage
4.	Goa	2019	Mandatory to be done (T&CP)
5.	Gujarat	2015	Additional FAR & FSI/Relaxation in consulting charges
6.	Haryana	2017	Additional FAR & FSI/Mandatory for government & PSU's
7.	Himachal Pradesh	2017	Additional FAR & FSI
8.	Jharkhand	2017	Additional FAR & FSI
9.	Kerala	2011	Mandatory to be done (PWD)
10.	Maharashtra	2011	Relaxation in premium & property tax
11.	Odisha	2018	Incentive as per state govt.
12.	Punjab	2013	Additional FAR & FSI
13.	Rajasthan	2014	Additional FAR & FSI
14.	Sikkim	2015	Additional FAR & FSI
15.	Uttar Pradesh	2011	Additional FAR & FSI
16.	Uttarakhand	2017	Additional FAR & FSI/Mandatory for govt. buildings
17.	West Bengal	2015	Additional FAR & FSI



**Fig. 1. Details of Incentives by GRIHA (Source GRIHA Website).**

## RESULTS

1. Out of 28 states and 8 Union territories in India, a total of 15 states and 2 Union Territories are providing incentives to the green rated projects.
2. Uttar Pradesh government took the lead of incentivization in the year 2011 and then after other states and Union territories also started providing incentives.
3. Chandigarh, Goa, Haryana, Kerela and Uttarakhand government have made the mandatory compliances to go for green rated construction activities in the case of public buildings.
4. The incentives provided by most of the government bodies is in the form of additional Floor Area Ratio (FAR) and Floor Space Index (FSI)
5. The highest incentive is being provided in Uttarakhand in terms of FAR, varying from 10%, 20% and 30% respectively if a private project can achieve 3, 4 or 5-star rating by GRIHA or Silver, Gold and Platinum rating by IGBC/LEED.
6. The best type of incentive which has been chosen by 10 out of 15 state governments and one Union Territory is in the form of providing additional FAR & FSI without any extra charges.
7. The research paper will work as a base for other state governments and Union territories so that they can also start providing incentives in one or the other form for promoting the construction of green rated projects.

## FUTURE SCOPE

The present study will enhance the knowledge of the stakeholders regarding the incentives provided by different state governments. Also, it will serve as a inspiring tool for other state governments and Union Territories to start providing incentives in alignment with the other government bodies which can promote the growth of green buildings and residential projects in India.

## REFERENCES

- Alwisy, A., BuHamdan, S., & Gül, M. (2019). Evidence-based ranking of green building design factors according to leading energy modelling tools. *Sustainable Cities and Society*, 47, 101491.
- Balaban, O., & de Oliveira, J. A. P. (2017). Sustainable buildings for healthier cities: assessing the co-benefits of green buildings in Japan. *Journal of cleaner production*, 163, S68-S78.
- Bhubaneswar Municipal Corporation. Request for Proposal

- (RFP) for Comprehensive Consultancy Services for North Zone Office Building Design. Bhubaneswar Municipal Corporation. [Online] 8 December (2017).
- Gupta, A., Amin, S., & Malik, F. A. (2022). An Investigation of Green Buildings in India. *Neuro Quantology*, 20(15), 3384-3393.
- Ghaffarian Hoseini, A., Dahlan, N. D., Berardi, U., Ghaffarian Hoseini, A., Makaremi, N., & Ghaffarian Hoseini, M. (2013). Sustainable energy performances of green buildings: A review of current theories, implementations and challenges. *Renewable and Sustainable Energy Reviews*, 25, 1-17.
- Green Rating Integrated Habitat Assessment (GRIHA) manual Vol. 01, (2019).
- GRIHA Council. Operationalisation of GRIHA with Pimpri Chinchwad Municipal Corporation (PCMC). Pune: GRIHA Council, (2011)
- Haryana Government. The Haryana Building Code 2017. Town and Country Planning Department, Haryana. [Online] 30 June (2016).
- Indian Green Building Council. IGBC, Indian Green Building Council. [Online]
- Li, F., Yan, T., Liu, J., Lai, Y., Uthes, S., Lu, Y., Long, Y. (2014), Research on social and humanistic needs in planning and construction of green buildings. *Sustain. Cities Soc. Vol. 12*, 102-109.
- Ministry of Statistics and Programme Implementation, Government of India. Ministry of Statistics and Programme Implementation. Energy Statistics (2019). [Online].
- Ministry of Urban Development, Government of India. Smart Cities Mission Statement & Guidelines. Smart Cities Mission. [Online] May (2015).
- Pimpri Chinchwad Municipal Corporation. Green Building Initiative. Pimpri Chinchwad Municipal Corporation. [Online] (2011)
- Sun, C., Li, Z., & Li, X. (2019). Research on Green Building Incremental Cost Optimization., *IOP Conf. Ser. Earth Environ. Sci.*, 267, 052040.
- Saadatian, O., Sopian, K., Lim, C. H., Asim, N. & Sulaiman, M. Y. (2012). Trombe walls: A review of opportunities and challenges in research and development, *Renew. Sustain. Energy Rev.* 16, 6340-6351.
- Soni Alankrita and Priyanka Kochhar (2020). Role of Financial Institutions in promoting green buildings. [interv.].
- The Energy and Resources Institute (TERI). Energy Efficiency Potential in India. Indo German Energy Forum. [Online] August (2018)
- Uttar Pradesh Real Estate Regulatory Authority. View Projects. Uttar Pradesh Real Estate Regulatory Authority. [Online] 14 September (2020)

**How to cite this article:** Anshul Jain and Ananda Babu K. (2024). Incentivization of the Green Rated Projects by Government for Promoting Sustainable Development: Case Study of Indian States and Union Territories. *International Journal on Emerging Technologies*, 15(2): 33-38.